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Cost Economies for an Airline: An Analysis of Airlines' Operating Costs

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Abstract-*This study focuses on analyzing the variables affecting the average operating cost per aircraft movement. Since airlines around the world are operated on thin profit margins and with increasing competition from Low Cost Carriers it will be important for an airline to get a complete understanding about their operating cost structure. The aim of this study is to suggest an airline of actions to reduce their operating cost and will differentiate the cost structures of Low Cost Carriers and Full Service Carriers. This study was conducted for 20 airlines which were operating in Asia Pacific region. Published financial and statistical data were used for analysis and a parametric approach was used. The results of this study do not suggest economies of scale for the airline, which is to have higher number of aircraft to reduce cost.*

Keywords-*Operating Cost; Airline; Low Cost Carriers; Full Service Carriers*

1. INTRODUCTION

Airlines, despite of its glorious looks and spread wings make thin profit margins around the world; IATA introduction to Airline Industry (2013). Therefore, it is important to study the operating cost structure of an airline to recognize the factors affecting the operating cost, so that it will help the airlines to reduce it to increase or maintain the profit margin.

Furthermore, low cost carriers or budget airlines are growing in Asian region. Seat capacity of the budget airlines in Asia has grown from 479 million to 532 million which is an 11% in 2018. It has been 18% in 2017 according to anna aero.com (2019)[2]. In the same website it has been forecasted that budget carriers will grow up to 50% of the market share by 2030. To face the challenges of low price coming from these budget airlines, full service airlines will have to re-visit their operating cost structure in order to survive in the business. This study aims to focus on the problem of identifying the relationship between the main drivers of operating cost of an airline and the operating cost per aircraft movement. Based on that the problem the identified research question was "How do the main cost drivers of an airline influence the operating cost per aircraft movement?" This paper analyzes the main drivers of operating cost of the airlines. For the ease of data gathering this study will be limited to selected airlines in Asian Region. Published and non-published financial data will be used to derive conclusions and operational data has also been used. The market variables such as oil price also has been considered to arrive at an objective conclusion and the data analysis will focus on operating cost per aircraft movement, which will enable the policy makers of the airlines to arrive at clear decisions.

Main objective of this paper is to find out the relationship between the identified cost driver and the operating cost of the airline. This will help an airline in imposing cost controls and thrusting the airline to a better future whilst facing the increasing competition from the budget airlines, which are successfully reducing all the operating cost. However, researcher believes that this study can be replicated to other industries as well given that the cost drivers in the particular industry are specifically identified.

The focus on this paper will be to analyze the relationship between the cost drivers and the operating costs of an airline. Cost drivers are recognized at three main levels;

- Output characteristics-No. Of Flights, Points Served, and Load factor
- Fleet Characteristics-Aircraft Utilization, Average age of the fleet, Average number of aircraft
- Airline Market Characteristics-Oil Price, Number of employees.

2. REVIEW OF LITERATURE

2.1. The effect on output based characteristics on operational cost

Hansen, 2001 has stated that critical cost drivers are irregularities in the system which leads to flight cancellation; an output based characteristic. Similarly Gillen et al (1990)[5] and Windle (1991)[14] has stated that there is a positive impact on airline output and the airline cost; indicating that better the performance of the airline higher the operating cost. A diverse network will be costly to the airline. This however doesn't imply a loss making situation.

However, Baltagi et. Al (2001) states a different opinion; that the output characteristics have an inverse relationship

with the operating cost of an airline. Implying that increase in flight numbers will reduce the cost per aircraft movement, indicating the economies of scale which was discarded by White (1979)[13] stating in his research that even if the economies of scale were present in an airline they will be negligible.

Researchers such as Chua et al, (2005)[4] have found that, there is an inverse relationship between load factor and the operating cost of an airline. Higher the load factor, lower the operating cost was. Mantin and Wang (2012)[9] found out that load factor has a positive relationship with operating margin, indicating that it has a negative impact on operational cost. Only the study of Gitto and Minervini (2007)[6] has found out there is no significant relationship between load factor and operating margin.

2.2. The effect on fleet characteristics on operational cost

Swan and Adler (2006)[11], has stated that there is no significant relationship between the age of the fleet and the operating cost. This is due to the offsetting impact of the higher maintenance cost and the lower depreciation/lease interest of the aircraft. Bruggen and Klose (2010) has suggested that airlines with uniform fleet; most commonly in this part of the world, it is either Airbus or Boeing, will have lower operating cost due to training and upgrading efficiencies of the flight crew. Sri Lankan Airlines has 27 aircraft in their fleet all consisting of Airbus models due to this reason (Annual Report of SriLankan Airlines Limited, 2016/2017).

Mantin and Wang (2012)[9] have found a negative relationship between the aircraft utilization and the profit margin, indicating higher the utilization; lower the operating cost. Tsikriktsis (2017)[12] has supported this in his findings.

Bruggen and Klose (2010) have found that higher the number of aircraft in the higher the operating profit, which will be resulted by lower operating cost. This will be a result of lower lease cost arrangements and cross functional utilization of staff due to the large number of aircraft.

2.3. The effect on airline market characteristics on operational cost

Whilst Gitto and Minervini (2007)[6] found that there is no significant relationship between number of employees and the airlines operating cost; Ryerson and Hansen (2013)[10] and Anbil et al. (1991)[1] has found that lower the fuel/ labor cost in the airline market, higher the operating margin is.

In addition to these mentioned factors, hub dominance leads to significant cost savings according to Banker and Jhonston (1993)[3]. Alliance partnership is not a significant cost driver according to Goh and Yong (2006)[7]. Windle (1991)[14] has mentioned that private owned airlines have lower operating costs than the government owned ones.

Above mentioned characteristics under the three main categories will be analyzed to find out the relationship between them and the operating cost of an airline.

3. METHODOLOGY

3.1 Approach

Even though the previous research on airline cost has been based on non-parametric approach, a parametric approach has been taken for this study following the method used by Zuidberg(2014)[15]. According to Saunders (2009) parametric statistics are used with numerical data and is more powerful as a number of assumptions are made to detain them from producing spurious results.

Secondary data from multiple sources are used to gain the required information for this study, since ease of access and with the time limitation. Since financial and statistical information for Asian Airlines are already available it was decided to use the secondary data and apply the Ordinary Least Squares Regression model (OLS), to identify the effects of time invariant variables such as points served etc.

For this study financial and statistical data from financial year 2016/2017 was considered as it was the latest available data for most of the airlines considered.

3.2 Variables

In this study the main independent variables are the three characteristics mentioned earlier namely; Output characteristics, Fleet characteristics and Airline Market Characteristics. The dependent variable would be the Total Operating cost of an airline for the given year, 2016/2017.

Table 1. Operationalization of the variables

Variable	Indicators
Output characteristics	No. of Flights, Points Served, Load Factor
Fleet Characteristics	Utilization, Age, Average Number of aircraft
Airline Market Characteristics	Oil Price, Number of employees

3.3 Data

3.3.1 Independent Variables

Output Characteristics

Number of flights in the financial year, points served or destinations, and load factors were taken from each airline's annual report for financial year 2016/2017.

Fleet Characteristics

Aircraft utilization was taken for each aircraft type as follows;

Utilization=Block Hours/ Number of aircrafts in the particular aircraft type.
Average age of the fleet and number of aircraft were readily available in the airlines' annual reports.
Airline Market Characteristics
Number of employees or the staff strength was derived from the airline's annual report. Oil Prices were taken from S & P Global Platts websites for each airline's hub

3.3.2 Dependent Variable

Operating cost per aircraft movement was measured by
=Total operating cost of the airline/N of aircraft movements (No. of flights)
Both the data was taken from each airline's annual report.

3.4 Sample

Based on the airline registry in International Air Transport Association (IATA) which is the regulatory body of airlines in the world, there are 44 airlines in their region classification of Asia Pacific. From the 44 airlines this research was based on 20 airlines which mark up to around 45% of the total population.
To establish the credibility of the data, Annual reports were taken from the official web sites of the chosen airlines. Airlines were chosen randomly to minimize the bias and to generate a representative sample. It was assumed that no dummy variables to be added to distinguish the Low Cost Carriers and Full Service Carriers assuming that there is no precise distinction and some of the Full service carriers have already adopted Low Cost Carriers' characteristics.

3.5 Hypotheses

Based on the mentioned literature sources, following hypotheses were drawn for the study.

- H1 -Increase in the number of flights will lead to lower operating cost per aircraft movement due to economies of density
- H2 -Increase in the number of points served leads to higher operating cost per aircraft movement
- H3 -A higher load factor will lead to lower operating cost per aircraft movement
- H4 -Higher aircraft utilization leads to lower operating cost per aircraft movement
- H5 -No significant relationship between the average age of the fleet and Operating cost per aircraft movement
- H6 -Higher number of aircraft will lead to lower operating cost
- H7-Negative relationship between oil price/employee number and operating cost of the airline.

4 ANALYSIS

4.1 Output Characteristics

The number of airline operations or the number of flights negatively correlates with the operating costs, which supports the findings of Baltagi et. Al (2001), implying economies of density. Therefore H1 is accepted.
In accordance with the findings of this study, an airline which is focusing on reducing its operating cost should be concentrating to its focal points rather than spreading out its destinations. Higher the number of points served, higher the operating cost was, accepting H2 which is stated above. This finding follows the research results of Gillen et al (1990)[5] and Windle (1991)[14], that a diverse network will be costly to the airline. Load factor doesn't significantly impact the operating cost, indicating that the marginal cost of an additional passenger will be negligible to the airline. This also proves the economies of scale in the load factor which was supported in the previous studies such as Gitto and Minervini (2007)[6] and contradicts with the findings of Mantin and Wang (2012)[9] who found out a positive relationship between the two variables. Therefore, H3 should be rejected.

4.2 Fleet Characteristics

Results of this study show a negative effect of aircraft utilization on operating cost per aircraft movement. This implies that, higher utilization leads to lower operating cost; H4 should be accepted. This finding supports Mantin and Wang's findings (2012)[9]. Furthermore the results of this study suggests that, older the fleet, lower the operating cost indicating that ownership cost of a new aircraft will surpass the maintenance cost of an old aircraft. This contradicts with the findings of Swan and Adler (2006)[11], who stated that there is no significant relationship between the age of the fleet and the operating cost of the airline. Therefore H5 should be rejected. Number of aircraft in the fleet has no Significant relationship with operating cost per aircraft movement. This finding contradicts with Bruggen and Klose (2010) research results, where they have stated that there is a significant positive relationship between number of aircraft and the operating cost of the airline. H6 should be rejected in light of these findings.

4.3 Airline Market Characteristics

Staff cost or the number of employees and oil price has a significant relationship with the operating cost of the airline. Higher staff cost per employee and higher average oil price lead to higher operating cost per aircraft movement. Therefore H7 can be accepted. Oil Price will be affected by external factors such as depreciation of currency and OPEC regulations etc. Employee cost will be mainly influenced by the number of employees. In addition to that minimum wage regulations and industry regulations will also impact the employee cost.

5. CONCLUSION

An airline can gain some cost savings suggestions from this study. Higher utilization of aircraft, irrespective of the number of aircraft in the fleet will help in the reduction of operating cost of the airline. Concentrating on to the main profit earning routes will be advantageous to an airline which is aiming to reduce its cost. If the airline is struggling for cash and is suffering with lower

profitability, then it is better not to invest cash on new aircraft as new aircraft would increase the operating cost which will lead to worse bottom line. Voluntary retirement schemes can be introduced to cut down the staff number in hard times. Hedging arrangements can stabilize the fuel prices and will favorably impact the airline's profitability. This research differentiates the cost structure between the budget carriers and the full service carriers. Budget carriers cut down their cost from higher utilization, high load factors and with lower staff numbers. Full service carriers will reduce their cost through using older aircraft, hedging arrangements, and with larger average aircraft size.

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